

Survey of Sediment Quality in Puget Sound, 1997-1999 —Triad Synthesis

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Extended Abstract

Surficial sediments from 300 locations throughout Puget Sound were collected during June of 1997, 1998, and 1999, and tested to determine measurements for the “Sediment Quality Triad” (Long and Chapman 1985) parameters of toxicity, chemical contamination, and benthic infaunal community structure. This effort was part of a three-year cooperative agreement between the Sediment Monitoring Component of the Puget Sound Ambient Monitoring Program (conducted by the Washington State Department of Ecology) and the National Oceanic and Atmospheric Administration’s National Status and Trends Program. The results from four toxicity tests, concentrations of over 160 chemical compounds measured in the sediments, and a suite of benthic infaunal indices, including total abundance, major taxa abundance, taxa richness, Pielou’s evenness, Swartz’s dominance, and the top 10 dominant species, were compared both within and among the 300 Puget Sound stations. Suites of stations are identified and displayed which provide evidence either for or against “pollution-induced degradation” (Chapman 1996) of the sediments. The spatial extent of “pollution-induced degradation”, i.e., the total number of stations, total area (km²), and percent of the total study area that each of these station suites represents, is summarized for the Puget Sound study area. The triad synthesis provided “evidence for pollution-induced degradation” at 39 stations representing 22.8 km² or 1% of the total study area. These stations were located primarily in urbanized bays, including Everett Harbor, Port Gamble, Dyes Inlet, Sinclair Inlet, Elliott Bay, Commencement Bay, and the Port of Olympia. Strong “evidence against pollution-induced degradation” (i.e., no significant toxicity or chemical contamination, and infaunal populations that appeared to be abundant and diverse) was observed at 81 stations (992 km², or 42% of the total study area), located primarily in nonurban/industrialized locations throughout Puget Sound. The remaining 180 stations (1348 km², or 57% of the study area), located throughout the study area in both urban and nonurban locations, displayed a mixture of significant triad parameters, but not the full suite, suggesting that sediments are compromised to some degree. Detailed results from each year of the study are published in Long et al., 1999, 2000, and in prep. A report summarizing all three years of data, with multivariate analysis to further determine relationships between the triad parameters, will also be prepared.

References

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